UNITED STATES DISTRICT COURT FOR THE
DISTRICT OF MASSACHUSETTS

MASSACHUSETTS DEVELOPMENT FINANCE AGENCY
Plaintiff,

v.

ADP MARSHALL, INC., a FLUOR DANIEL COMPANY, and FIREMAN'S FUND INSURANCE COMPANY
Defendants,

ADP MARSHALL, INC.
Plaintiff in Counterclaim,

v.

MASSACHUSETTS DEVELOPMENT FINANCE AGENCY
Defendant in Counterclaim,

ADP Marshall, Inc.
Third Party Plaintiff,

v.

ALLIED CONSULTING ENGINEERING SERVICES, INC. ANDOVER CONTROLS CORPORATION, R & R WINDOW CONTRACTORS, INC., AND DELTA KEYSPAN, INC. N/K/A DELTA KEYSPAN, LLC, MADDISON ASSOCIATES, INC., UNITED STATES FIDELITY AND GUARANTY COMPANY) FIDELITY AND DEPOSIT COMPANY OF MARYLAND, NATIONAL GRANGE MUTUAL INSURANCE COMPANY, TRAVELERS CASUALTY AND SURETY) COMPANY OF AMERICA, AMERICAN HOME ASSURANCE COMPANY, HARTFORD ROOFING COMPANY, INC., and SPAGNOLO/GISNESS & ASSOCIATES, INC.
Third Party Defendants.

C.A. No.: CV 10203 PBS

EXPERT DISCLOSURE OF THE PLAINTIFF,
MASSACHUSETTS DEVELOPMENT FINANCE AGENCY

Pursuant to Fed.R.Civ.P. 26(a) the Plaintiff, Massachusetts Development Finance Agency (hereinafter "MassDevelopment") hereby supplements its expert designations in the above-referenced matter. MassDevelopment has attached hereto expert reports of Richard J. Comeau, P.E. (attached as Exhibit A) and Mr. Stephen J. Wessling, AIA, CSI, BOCA (attached as Exhibit B), which have been served on all counsel of record in this matter. MassDevelopment reserves the right to supplement this disclosure upon receipt of any additional expert disclosure submitted by any other party to this matter.

Respectfully submitted,
MASSACHUSETTS DEVELOPMENT
FINANCE AGENCY
By its attorneys,

Edward F. Vena, Esquire
BBO NO. 508660
Sabatino F. Leo
BBO NO. 642302
VENA, RILEY, DEPTULA, LLP
250 Summer Street
Boston, MA 02210
(617)951-2400

Dated: 12 May 2005

CERTIFICATE OF SERVICE

I, Sabatino F. Leo, Esquire, hereby certify that I have, on this ___th day of May, 2005, served a copy of the within by first-class mail, postage pre-paid upon all counsel of record.

Sabatino F. Leo

EXPERT REPORT OF RICHARD J. COMEAU, P.E.

A. Expert's Qualifications

A copy of curriculum vitae is attached hereto.

B. Expert Testimony at Trial or Depositions Within Past Four Years

None.

C. Publications and Presentations Authored Within Past Four Years

None.

D. Materials Reviewed

1. ATMC[1] RFP SPECIFICATIONS - DATED 04/03/2000

2. ATMC RFP VOLUME #1 - DATED 04/03/2000

3. ATMC RFP VOLUME #1 - UPDATED 05/05/2000

4. ATMC - LAB FITUP BULLETIN NO. 2 TAGGED EVENT #0070

HVAC SPECIFICATION - DATED 01/15/01

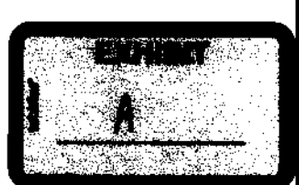
5. ATMC – Various Equipment Operating & Maintenance Manuals
(Excludes Equipment Capacity Data)

Trane Equipment
Pump Equipment
Gas Fired Hot Water Boilers
Motor Starters
Unit Heaters and Fan Coil Units
Fans
VAV Boxes
Hydronic Reheat Coils

6. Automatic temperature controls – operation and maintenance manual
(Excludes Sequence of Operation)

7. HVAC System Design Drawings (All drawings are stamped as-built 11/22/02)

[1] Advanced Manufacturing Technology Center, Fall River, MA.



DRAWING NUMBER	DRAWING NAME
20043-H1.1	HVAC FIRST, SECOND & ROOF DUCT PLANS - REV. 2 06/05/01
20043-H1.2	HVAC PENTHOUSE & ROOF DUCT PLANS - REV. 2 06/05/01
20043-H1.3	HVAC CORE DUCT PLAN - REV. 2 06/05/01
20043-H2.1	HVAC FIRST, SECOND & ROOF PIPING PLANS - REV. 2 06/05/01
20043-H2.2	HVAC PENTHOUSE & ROOF PIPING PLANS - REV. 2 06/05/01
20043-H3.1	HVAC SCHEDULES & DETAILS - REV. 2 06/05/01
20043-H3.2	HVAC DETAILS - REV. 2 06/05/01 [2]
20043-H4.1	ATMC HVAC SCHEMATICS - REV. 2 06/05/01

TENANT DEVELOPMENT WORK:

20013-H1	HVAC - WEST WING FIRST FLOOR - DATED 05-17-01
20013-H3	HVAC - EAST WING FIRST FLOOR - DATED 05-17-01

E. Findings/Opinions

1. PENTHOUSE LEVEL OUTDOOR AIR INTAKE LOUVER SIZING

There is an air intake louver at the penthouse level of the facility which serves all 3 air conditioning systems for the building and one penthouse mechanical room heating and ventilating unit. The penthouse level air conditioning units and heating and ventilating unit have a potential peak outdoor air requirement of approximately 71,000 cubic feet per minute ("CFM").

The equipment involved is summarized as follows:

[2] There were two issues of this document received, stamped as-built, bearing different revision dates-the latest version was used for review.

Designation	Service	Total Capacity	Min outdoor Air	Economizer
AHU-1	West Wing	24,000 CFM	3,000 CFM	Yes
AHU-2	Center Area	15,000 CFM	2,800 CFM	Yes
AHU-3	East Wing	29,000 CFM	29,000 CFM	N/A
HV-1	Penthouse	2,000 CFM	2,000 CFM	Yes
Totals	N/A	71,000 CFM	36,800 CFM	

All of this equipment may potentially require full outdoor air under economizer cycle operation. The term `economizer cycle' refers to periods when the outdoor air temperature is below 55°F and mechanical cooling can be shut down to save electrical energy. During summer periods a mechanical system would draw the minimum outdoor air as indicated in the table above. At approximately 55°F the peak outdoor air flow may be as high as the total CFM indicated in the table above. Below 55°F the amount of outdoor air usually modulates down based upon the amount of facility cooling required. Obviously systems like AHU-3 would not modulate the amount of air required as it is a fixed flow system. Typically in the HVAC trade outdoor air louvers are sized for the worst case scenario or the systems anticipated maximum outdoor air intake. The period when maximum outdoor draw occurs in a case such as this would be when outdoor air temperatures are approximately 55°F. Industry standard outdoor air louvers typically require such outdoor air louvers to be `weather proof'. This terminology generally refers to the sizing of the louver equipment as well as the design of the individual louver blades to minimize water intrusion.

Typically industry design standards for outdoor air louvers have used 350 FPM as the maximum allowable face velocity and the louver blade design must include a vertical offset to catch incoming rain. For upwards of potentially 72,000 CFM of outdoor the required louver size would be approximately 208 square feet.

The existing penthouse outdoor air louver is sized at approximately 19.25' wide by 5.25' high for a total face area of approximately 101 square feet. While it can be argued that the penthouse heating and ventilating unit would not normally be running that equipment only represents about 6 square feet of total louver area.

The next issue in this discussion is that the outdoor air louver installed does not appear to be representative of the type discussed in the RFP documents. Typically air intake louvers have a vertical front face on the front of the louver blade to help with drainage. The existing louver has the outside front face with a trough design to catch water. This may be an issue in that the existing louver is the wrong type or simply installed upside down and backwards. In either event this louver would require replacement as the

existing louver has had the bird screen screwed to the interior face blades thus a reversed louver appearance would be marred.

The existing outdoor air louver equipment is too small for the described service and thus some sort of renovation has to be accomplished: Thus the following appears to be the best approach:

A. Retain the existing outdoor air louver location and replace the existing louver with a correctly configured louver in accordance with the original RFP documents. This louver would only serve AHU-3 and HV-1 which would require approximately 88.6 square feet of face area.

B. Provide a new penthouse west wall louver which would accommodate the needs of AHU-2 and AHU-3. This louver would be installed north of the existing west wing access door and configured to match vertically with the existing west wall louver. This would roughly translate into a louver, for 39,000 CFM, or about 111 square feet of face area. For a 5.25' high louver this means it would have to be roughly 21.25' long.

2. PENTHOUSE LEVEL EXISTING OUTDOOR AIR INTAKE LOUVER WATER LEAKAGE

The existing outdoor air intake louver plenum construction does not match the design build documents detail for same. The design build document detail, as shown on drawing 20043-H3.1, indicates that the outdoor air louver plenum sheetmetal is to be lapped over the bottom blade of the louver for drainage. The apparent floor leakage stains from the existing louver plenum indicate that the existing louver plenum is not built to these standards.

3. PENTHOUSE LEVEL EXISTING OUTDOOR AIR INTAKE LOUVER DEPTH SIZING

The existing outdoor air louver plenum was detailed to be approximately 36" deep to allow air to come through the louver and then slow down momentarily to drop entrained moisture before going into each duct serving individual AHU and H&V units. The existing plenum is only 20" deep which aggravates the situation with louver air intake velocities being too high. The existing louver plenum and proposed additional louver should be rebuilt/built to comply with the design-build engineers detail as those standards are correct.

4. AHU-3 OUTSIDE AIR DUCT SIZING

The existing outdoor air intake duct sizing to AHU-3 appears to be undersized. Drawing 20043-H1.2 duct sizing indicates that outdoor air intake duct velocities are approaching 2,800 FPM, which is way too high for the application in order to reduce moisture carryover as well as to reduce the load on the supply air fan. In the case of AHU-3 it has the potential to draw in rain/snow from the outdoor louver plenum and carry it

across the room into the AHU air intake section. This evidently now occurs occasionally based upon the local floor flooding stains around the air intake section of that equipment. Also such high air intake velocities add power consumption to the supply fan which is needless given the large mechanical room space available for the installation of the fresh air duct.

5. AHU-1 & AHU-2 OUTSIDE AIR DUCT SIZING

The existing outdoor air intake duct sizing to AHU-1 appears to be undersized. The existing drawing 20043-H1.2 duct sizing indicates that outdoor air intake duct velocities are approaching 2,300 FPM, which is high for the application. In the case of this equipment it is equipped with a return air fan and thus the fan friction incurred for drawing in outdoor air movement is added to the supply air fan equipment static pressure needs of that system and reduces that systems' overall potential effectiveness. The existing outdoor air duct needs to be replaced as part of the installation of the new outdoor air louver equipment which would resolve moisture carry over as well as resolving issues with compromising overall AHU air handling capacity.

The outdoor intake duct sizing for AHU-2 from the outdoor louver to the AHU equipment appears to have been more normally sized with a peak velocity of only 2,000 FPM.

6. AIR CONDITIONING LOAD COMPARISONS FOR EACH OF 3 SECTIONS

The various building air conditioning loads have been reviewed to determine what was supposed to be accomplished under the design build contract and then compare that to what was done. A variety of cooling load scenarios have been run for each of the three major sections, west, center and east sections and compared to the original RFP requirements. There is no specific data provided relative to design conditions for each area other than an obtuse reference to 78°F for office area.

In reviewing the various areas by computer modeling the east and west wings appear to have good air side cooling capacity and a lot of additional flexibility as there is local chilled water available at each space.

The center/knuckle office area served by AHU-2, however, presented a problem in being able to match up AHU air handling capacity and potential space cooling load. A variety of computer runs were accomplished for varying degrees of occupancies and after a while it became apparent the only way we could match up the space cooling load with the existing AHU CFM capacity was to assume the exterior glazing system was tinted in lieu of the clear/low E-coated glass specified in the RFP documents. This office contacted Steven J. Wessling Architects to ascertain what the glazing shop drawings indicated for the building glazing system. The original RFP appeared to indicate that clear glazing with a low `E' coating was to be used and the glazing shop drawings appeared to confirm that option.

In addition, direct solar impact in various spaces has been an ongoing problem regardless of local space temperature control compliance.

Our office has looked at a variety of remedial approaches and the net result of that analysis indicates that the best resolution would be to apply some sort of tinted glass film to the center/knuckle section exterior glazing. Other approaches would involve replacement of the central equipment and duct distribution systems which is totally impractical and still keep the center section in operation, let alone how to replace existing duct systems now in place.

7. MISCELLANEOUS BUILDING VARIABLE AIR VOLUME VALVES

There were a number of miscellaneous air valves provided, serving common areas, i.e. corridors, on the HVAC system design documents which were not referenced on the design documents for the provision of heating capacity and how to handle local temperature control. There were five such devices which during our recent inspection have already been retrofitted by the operating staff to include hot water piping and in one case a reheat coil was also added.

8. EAST SIDE EXHAUST AND HEAT RECOVERY SYSTEM

The existing east side exhaust system remains an enigma relative to what was/is intended to be accomplished. The following issues arise:

A. None of the exhaust ducts above the roof have their joints and/or seams sealed which is believed to be a code requirement.

B. None of the exhaust system ducts and/or heat recovery plenums, above the roof, have any sort of insulation which would appear to defeat the purpose/efficiency of the intended heat recovery during peak cold and hot weather periods.

C. The east side exhaust system utilizes individual exhaust fans from each lab area which discharge at roof level into a central collection duct which in turn is discharged to atmosphere by the dual central exhaust system fans. The existing configuration has relief air being drawn at the end of the central duct collection main which would defeat the purpose of energy recovery. It is believed that this problem is related to the fact that there is no sequence of operation provided so no one understands how things are supposed to operate. In a recent site visit the building operator asked how he should be running this portion of the system as both central exhaust fans were on line. The correct procedure would be to only operate one with the second fan as a backup. Our concern is that it appears the heat recovery coil is installed so close to the central fan equipment intakes that if you were to shut down one central exhaust fan then the other fan may not properly draw the total air required for proper system operation. This issue was not investigated further other than identifying the issue. It may be that some reconfiguration of the central heat recovery coil plenum would be required to allow more room at the outlet side of the heat

recovery coil to allow more room for air to enter which would also allow room for pressure relief for the fan equipment in that same section of the plenum.

9. AUTOMATIC TEMPERATURE CONTROL SHOP DRAWINGS

Our office has received a copy of the temperature control shop drawings for the work but there is no english language description relative to how the equipment and controls are to work together, i.e. 'sequence of operation'. This problem needs to be corrected for record purposes and to aid the maintenance personnel who have to operate the facility.

10. HVAC SYSTEM AIR AND WATER BALANCING

It appears that the existing HVAC systems have not been air and/or water balanced as of yet. There are no reports on what was accomplished. The original specifications are not clear on when this activity is supposed to occur. The RFP specifications appear to provide quite detailed requirements on providing this data upon completion of the work but what is missing is providing such data when the facility is partially occupied. Balancing work is needed for those portions of the systems which are installed and the relative spaces occupied. The building management has commented that in some areas there appears to be insufficient water temperature to handle heating needs. An inspection of the design drawings indicated that the hot water system flow diagram, drawing 20042-H4.1, shows that the hot water system is to be arranged as a reverse return system which is usually almost self balancing. However, the hot water piping plans, drawing 20043-H2.1 appears to indicate a section of the piping system which is hooked up in a direct return format. Such a mixed system design format may lead to problems with out the system balanced to insure that water is available to all heating devices.

11. MISCELLANEOUS AREA HEATING PROBLEMS

There are a small number of areas where the heating equipment appears to be undersized. These areas include stairwells and end of corridors. The extent of this problem is considered relatively minor as remedial work may consist of replacing some fintube sections with convectors and replacing convectors with cabinet heaters. The areas where specific problems have been noted include the east and west end stairwells. In these areas the existing convector equipment would be replaced by appropriately sized cabinet heaters. At the end of the corridors, 4 locations, the fintube radiation would be replaced with higher capacity convectors.

12. HOT WATER SYSTEM RECIRCULATION NEEDS

The building hot water heating system piping loop is indicated to be equipped with what is termed 2-way type hot water control valves for all of the remote space heating and air system coils. On a system of this size there is normally the need to insure that some sort of hot water circulation is occurring to insure that hot water is available throughout the hot water system. Most of the time a hot water system of this type is always calling for some

water flow but there may be situations where water flow in various legs is shut down due to lack of local demand. The net result is that the hot water system may lose control and/or heating capacity on isolated legs and may seem to be very slow to react to local controls. The fix in this matter would be to replace the 2-way control valves on the last heating device at the end of each hot water loop. This would require the replacement of one control valve in each of four (4) piping loops and piping in the control valve bypass line of each new control valve.

It was determined that the building hot water heating system piping feeds were piped incorrectly, piped backwards from what was shown on the drawings. Evidently the main heating system circulation pumps installed were not of the capacity indicated on the HVAC design drawings. The installed pumps were sized at 350 GPM in lieu of the specified 470 GPM equipment. The difference in pump capacity coincidently exactly matches the quantity/flow the heating system piping loop was supposed to get. If you couple the building heating loop being piped backwards and the fact the main circulation pump capacities were reduced by that quantity of flow you compound the problem for the building heating system.

F. Basis for Findings

I base my findings on my experience, education, and review of the materials listed above.

Richard J. Comeau, P.E.

PROFESSIONAL RESUME

RICHARD J. COMEAU
President and Treasurer

DATE OF BIRTH

October 16, 1939

EDUCATIONAL BACKGROUND

Northeastern University B.S.M.E. 1963
Northeastern UniversityGraduate Program in Engineering Management

PROFESSIONAL REGISTRATIONS

Massachusetts	*# 24775*	*Indiana*	*# 18569*
Maine	*# 2892*	*New Hampshire*	*# 4611 **
Ohio	*# 38225*	*Virginia*	*# 11238*
New York	*# 47069*	*Connecticut*	*# 11597*
Rhode Island	*# 3680 ***	*Maryland*	*# 12803*
Vermont	*# 3147*		

** Inactive*
*** RJC personal PE license, not corporate*

Registrations Based Upon BSME Degree Status, Years of Experience and Sixteen (16) Hour Written Examination.

EXPERIENCE

JUNE 1979 TO PRESENT

Richard J. Comeau Engineers, Inc. President and Treasurer Responsible for all Engineering, Design, Company Format, Direction and Function.

JANUARY 1974 TO JUNE 1979

Thompson Consultants, Inc. Vice President, Clerk, Responsible for HVAC Systems Conceptual Approach, Engineering Design and Supervision of all Types of Projects from Simple Housing to more complex Hospital, Research and Industrial Plant Facilities

JUNE 1970 TO DECEMBER 1973

Francis Associates Progressed from Mechanical Engineer, Chief Mechanical Engineer, Office Manager to become an Associate. Responsible for forty (40) man staff and HVAC Systems Engineering and Design related to a Diverse Project Schedule

APRIL 1958 TO JUNE 1970

Anderson Nichols and Company, Inc. - Assistant Chief Mechanical Engineer
Stone and Webster Corporation - Mechanical Engineer
Sidney J. Greenleaf - Design Engineer
Hayden, Harding and Buchanan - Design Engineer
Fred S. Dubin Associates - (N.U. Co-op)
Metcalf and Eddy - (N.U. Co-op)

EXPERT REPORT OF STEPHEN J. WESSLING

A. Expert's Qualifications

A copy of curriculum vitae is attached hereto.

B. Expert Testimony at Trial or Depositions Within Past Four Years

None.

C. Publications and Presentations Authored Within Past Four Years

None.

D. Materials Reviewed

1. Architectural Drawings dated 12/27/00.

2. Maddison Associates, Inc. Drawings dated 12/8/00.

3. R&R Window Contractors, Inc. Drawings dated 2/2/01.

4. Architectural Drawings dated 6/22/04.

5. Architectural Drawings dated 05/02/03.

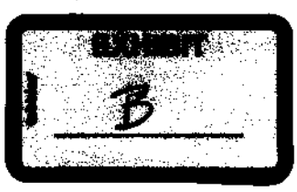
E. Findings/Opinions

See attached report dated March 26, 2003 which is incorporated by reference herein.[1]

As a supplement to the findings set forth in the attached report dated March 26, 2003, I offer the following opinions:

1. The architectural drawings do not call for standard exterior wall penetration flashing in several critical locations. Once the sealant fails, as it has, the building will leak. The sealant failure is either cohesion or adhesion failure, both of which are usually installation problems. The sealant beads in some locations, is too narrow to work properly. In other locations, it was adhered to a thin edge of metal, which cannot bond properly, so it failed. Flashing needs to be properly installed around the full perimeter of all door and window frames and at all interior and exterior corners of the gypsum sheathing behind the metal panels at a minimum.

[1] All photographs listed in said report have been previously provided to the Defendant, ADP Marshall, a Fluor Daniel Company.



2. All failed sealant must be removed and replaced. All missing sealant from joints between metal panels, door and window frame perimeters and dissimilar materials must be provided.

3. The curb on one of the roof doors is completely missing. Wind driven rain easily enters the building under the door. The other roof door has a low curb where melting snow could enter under the door. Eight-inch high properly flashed roof curbs need to be provided.

4. The exterior wall penetrations around pipes, conduits and ductwork, especially those above the second floor roof, are not properly protected from water penetration. All exterior wall penetrations must be properly sealed and flashed to prevent wind driven water from entering the building.

5. The parapet and wall intersections were improperly constructed. The flashing does not extend up the wall behind the metal panels far enough. There are openings in the building where water can enter and damage the interior finishes. Water easily enters the building through the unsealed seams in the gypsum sheathing. All parapet/wall intersections must be properly flashed to prevent wind blown water from entering the building.

6. The sealant needs to be properly installed so it can function properly for several years. Where the surfaces being sealed are too narrow for proper bonding and adhesion, a supplemental aluminum or galvanized metal angle will need to be provided.

7. All failed roof seams and cut roof membrane need to be properly repaired.

8. Water ponding on the roofs should be eliminated. The large pond of water on the roof adjacent to the roof door without a curb must be eliminated.

9. The exterior doors need to be provided with an ADA compliant threshold that includes a ½" high weather stop that is set in a full bed of mastic.

10. The horizontal mullions need to have properly sealed joints and a way of draining water, once it gets through the sealant, which will eventually fail.

11. The mechanical intake louver has been reported to be too small. It also appears to hold water and does not prevent wind blown or sucked in water from entering the duct system and mechanical unit. This louver needs to be replaced. The connection to the building and intake ductwork needs to be properly sealed, so it is water and weather tight. The full perimeter of the louver frame needs to be protected with flashing and sealant.

12. All failed insulated glass units need to be replaced.

13. The missing metal siding flashing needs to be installed.

14. All light fixtures need to be sealed across the top and down bot sides.

15. The flashing at the ends of the center parapet wall need to be completely redone.

16. The missing interior sealant needs to be installed at the full perimeter of all door and window frames.

17. All roof mounted equipment needs to have neoprene washers and sealant added over every fastener.

18. The roof mounted mechanical equipment needs to have the joint between the unit base and the rubber clad curb properly sealed to prevent water, snow and ice from entering through this joint.

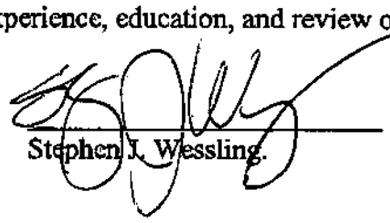
19. The top rail of exterior doors need to be sealed so water does not pond in the channel recess and then fall on the heads of occupants as they exit the building.

20. Sprinkler head escutcheons need to be provided on the exterior of the building.

The above corrective work will require removal of some of the exterior wall panels, and all of the windows, storefront, louvers and doorframes. All of this work needs to be done carefully, so as not to damage these building components.

F. Basis for Findings

I base my findings on my experience, education, and review of the materials listed above.



Stephen J. Wessling

WESSLING ARCHITECTS

STEPHEN J. WESSLING AIA, CSI, BOCA
PRINCIPAL - CEO

SUMMARY OF BACKGROUND

Registered, multi-disciplined architect, with over 39 years of in-depth experience on an extensive variety of building types and sizes.
Proven skills include:
cost effective designer; ability to build strong client/architect relationships; extensive experience in documentation and resolution of building problems; significant construction administration experience; extensive technical knowledge, proven ability to secure building permits and approvals at all stages of a project. Accomplished as a project manager, specifications writer, contract negotiator, design critic and contributing editor for Code Monitor. Computer literate with Windows, Macintosh, and AutoCAD software.

EXPERIENCE PRIOR TO ESTABLISHING:

Stephen J. Wessling - Architects, Inc.

March 1992 - October 1992: Barry Koretz Associates, Architects, Inc. - Principal

Nov. 1978 - March 1992 EHA Architects, Inc. - Principal

1974 - 1978 Bedar & Associates/ Bedar & Alpers Project Manager

1972 - 1974 Robert Charles Associates - Job Captain

1/72 - 8/72 Hugh Stubbins Associates - Senior Draftsman

1966 - 1972 Kenneth F. Parry & Associates - Junior Designer/Draftsman

EDUCATION

Boston Architectural Center: 1975 Bachelor of Architecture

Weymouth Vocational Technical High School: Post Graduate Program: 1967 Certificate in Architectural & Structural Engineering

PROFESSIONAL AWARDS

EHA -Illumination Engineering Society of North America
International Illumination Design Award - New England for St. Agatha Church. Lighting design March, 1989

PROFESSIONAL RECOGNITION

Consultant to clients, colleagues, and professional associations, presenting as an expert in building failure causes and remedies. Seminar topics include mold issues, building envelope failures, historic preservation, building use analysis (BOMA) and forensic architecture. Other distinctions include service as an expert witness in the courtroom, and peer reviews and consults with other architectural firms on the building exterior details.

REGISTRATION

Commonwealth of Massachusetts, No. 4191, 1976
NCARB No. 20,335 Rhode Island, Connecticut, New Hampshire, Maine, Pennsylvania, New Jersey

AFFILIATIONS

American Institute of Architects
Boston Society of Architects
Construction Specifications Institute
Building Officials and Code Administrators International
National Fire Protection Association

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Stephen J. Wessling - Architects Inc.

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Website: www.sjwarchitects.com

March 26, 2003

RE: ATMC
151 Martine Street
Fall River, MA
Building Leak Review
And Photographic Report

The following is the initial draft report of our review of the building exterior, interiors, architectural and shop drawings that were provided. As can be seen in the photographic report, we were able to easily find numerous defects in the building exterior where water is entering the building, causing water damaged to the gypsum board, acoustic tile, and in one case, mechanical equipment. Prior to visiting the building, we reviewed the architectural drawings, metal panel siding drawings and window and storefront drawings that we were provided.

Drawing review comments:

The Architectural drawings we received were dated 12/27/00.

1) A 2.3 - Head, jamb and sill details at exterior doors 300 and 302 are not indicated. It appears these details were not drawn.
2) A 2.4a – Plan details at the end of the parapet wall were not drawn.
3) A 2.4b – The roof plan indicates a slope column grid A-B and 14-15. This is an area with a significant water ponding problem. The roof slope does not appear to have been incorporated in all areas, because of the significant ponded water.
   a) The HVAC equipment is not fully drawn on the roof plans. The required coordination does not appear to have taken place. The penetrations through the exterior wall of the mechanical penthouse are not detailed.
4) A 2.4c – The roof details call for 2.8" thick rigid insulation. This does not provide the required "R" value of 20. R=20 requires 3.5". (Other drawings indicate 3" of rigid insulation.)
   a) Detail 11 is incomplete and flashing is not shown.
   b) Detail 14 is incomplete, dimensions are missing.
5) A 3.1 – East Elevation.
   a) This drawing is not coordinated with the HVAC pipe and conduit penetration through the wall where leaks are occurring.

b) Doors 302, details are not keyed into the head, jamb or sill. The required curb is missing from this door. Water leaks under and around this door and frame.

6) A 3.2 – Partial West Elevation.
   a) Details are not keyed into the louver.
   b) The aluminum ladder was not installed.
   c) The elevations do not show the light fixtures or wall penetrations.
7) A 3.3 - West Elevation.
   a) Exterior door does not have details keyed into it.
8) A 3.3 – East elevation.
   a) The loading dock is not drawn.
9) A 5.1 – Wall Section #1.
   a) Detail #5 – this is not the as-built condition.
   b) Window details are not keyed in
   c) Wall Section #2 Metal stud wall header sizes are not indicated.
   d) 4" extended cap on the horizontal mullion is called for, but we did not find a detail showing, attachment, sealing or weep holes.
   e) Wall Section #3 – Detail #10 A 6.1 Horizontal Mullion, shown at three locations, no weep holes or sealing called for.
10) A 5.2 – Detail #9 - Joint detail at roof overhang is not drawn.
   a) Wall Section #4 wall base detail not keyed in, assumed to be 4/A6.1.
11) A 5.3 – Section #2 Rear Door, Details indicated, either not drawn or not properly keyed in, marked with "X".
12) A 5.5 Section #3 – Base wall detail, not keyed in, assumed to be the same as detail 4/ A 6.1.
   a) Section #2 – Detail #6/A 6.1 not as-built.
13) A 5.6 Section #2 no details provided at the louver. Head, jamb or sill.
14) A 6.1
   a) Detail #1 – incomplete detail, not weather tight. Sealant and backer rod not installed under fascia as called for on this detail.
   b) Details #2 – Gypsum sheathing joints, are they taped with waterproofing? Not indicated, is it specified?
   c) Detail #3 – Exposed poly vapor barrier, is it fire rated? Are the seams and joints sealed airtight? Is the metal stud wall track sealed?
   d) Detail #3 – EPDM flashing is called to extend up 15" at wall base, did it?
      i) Slab vapor barrier is not called for on any drawing.
      ii) Flashing is not called for at the head, jambs or sill.
   e) Detail #5 – Backer rod and sealant was not installed under the fascia as called for in this detail.
      i) Roof edge detail is incomplete. The roof insulation is called to be 3".
   f) Detail #6 – Not built as shown. Was as-built detail submitted?
   g) Detail #7 – Flashing at outside corner not called for.
   h) Detail #8 – Sealant called for on both sides of curtain wall sill. Sealant was not installed on both sides of the frame.
   i) Detail #9 – No flashing called for, only 15 pound felt paper, and there are no panel joint details called for or drawn.
   j) Detail #10 – Horizontal mullion, missing joint details, weeps holes and sealant notes.
15) A 6.2
   a) Detail #1 - no joint or drainage details.
   b) Detail # 3 – 6" high clearance above the roof.

i) 3" rigid insulation called for.
ii) Extent of rubber flashing up the wall behind the panel, not called for.

c) Detail #4 – Slope on parapet cap shown but not called out or dimensioned.
i) Flashing is incomplete and missing.
ii) Parapet coping joint details not drawn.
iii) No corner flashing called for.
iv) Only 15 pound felt called for.

d) Detail #5 – No flashing called for at inside corner.

e) Detail # 9 – Not clear, incomplete flashing information.

f) Detail #10 –
i) Extent of EPDM flashing not clear.
ii) No Weep holes called for.

g) A 6.3 –
i) Detail #2 – No flashing at inside or outside corners called for. Parapet detail incomplete.
ii) Detail #3 - Flashing weep holes, sealant, and vapor barrier not called for.
iii) Detail #4 – Cant strip shown, not standard with EPDM fully adhered roof systems and it was not installed.
(1) Only 6" clear from roof to bottom of siding.
(2) 3" rigid insulation called for.
(3) EPDM flashing called to extend up the wall 12".
iv) Detail # 8 –
(1) ½" plywood called for, is it fire rated?
(2) Support of wall shown on 2 – 2 x 4 on the flat, this is not structural.
(3) Flashing not called for at the window.
v) Detail #9 –
(1) This is not the as-built condition.
(2) Plywood was installed instead of gypsum sheathing.
(3) The roof base wall flashing is called to extend up the wall 18". We could see the rubber flashing did extend 12"maximum, up the wall.
(4) Flashing under the wall cap was not clear. No details were provided showing the method for weatherproofing the cap or the cap joints.

h) A 7.1, A 7.2, A 7.3, A 7.4 and A 7.5.
i) Flashing at the doors and windows is not called for.
ii) Corner details are missing.
iii) Panel joint details are missing.
iv) Sealing of gypsum sheathing joints is not shown.
v) Sealant and backer rod are not called for at the interior of the window frames. We found cold air blowing into the building at the perimeter of some windows.

i) A 7.2 – Detail #2 – Mullion detail no sealing called for between aluminum framing members.

j) A 7.3 – Detail #5 – Detail at Service door, no sealant or flashing called for.

k) A 7.5 – Ladder details missing detail for attachment to the structure through the metal panel and detail for flashing and sealing the penetrations.

The Maddison Associates Incorporated Drawings

1) Drawings are dated before architectural drawings, 12/8/00.
2) HD-01 - No flashing called for.

3) HD-02 - Fasteners not called to be sealed. No flashing called behind fasteners where they penetrate the sheathing. Fasteners not shown secured into metal stud framing.
4) HD – 03 – Detail not as-built.
5) HD-04 – Closure missing also sealant, backer rod and weep holes not shown.

R & R Window Contractor Inc.
1) Drawings dated 2/2/01.
2) Page 11 of 22.
   a) No flashing called for.
   b) Drawing shows sealant on interior and exterior of window frames. It was not always installed on the interior.
   c) 1/8" wide sealant joint is not in conformance with the sealant manufacturers requirements of ¼" minimum.
   d) Mullion detail not provided.
   e) Details 33 and 34 sheets 21 of 22 - shows exposed gypsum sheathing, no sealant and no flashing.
   f) Sheets 1, 14, 16, 17, 18, 19, 20 and 22 not provided for our review.

- We requested copies of the specifications but have not received them as of this time.
- The drawings are lacking a significant amount of critical waterproof flashing. Once the sealant fails, and it already has water has, a direct path into the building.
- A number of details we consider very important were never drawn and the contractor appears to have constructed the building envelope with a series of openings for water to easily enter the building.
- Some of the details that were drawn were constructed differently. In some cases the as-built condition is more water and weather tight than the details drawn.

Photographic report:

The following photographic report shows our review on February 6 and March 18, 2003. As can be seen from the photographs, there are several reasons why this building is subject to leaks.

- There are a number of areas with failed and missing sealant.
- There are areas with incomplete flashing.

The following is a summary of the photographic report.

1) Photographs 1, 2, 3, 4 & 5 – Shows water stains on the horizontal framing member at the front entry. It appears water is leaking through the horizontal mullions and possibly the roof/parapet wall intersection.
   a) Photograph 242 & 243 – Water stained gypsum board directly above the Main Lobby and reception area. These leaks are most likely coming through numerous openings in the exterior wall in the Mechanical Penthouse.
2) Front Elevation, right portion.
   a) Photographs 6, 7, 8, 9 & 10 show failed sealant.
3) Right Side Elevation.

a) Photographs 11, 12, 13, & 14 show failed sealant and that the perimeter of the exterior wall light fixture is not protected with sealant. Even though the exterior light fixtures are usually equipped with a gasket, we find that the sealant bead is required, to prevent leaks through the hole in the exterior wall where the wires are located.

4) Rear Elevation.
   a) Photograph 15 – 21 - significant sealant failure.
   b) Photographs 16, 22 and 201 Water damaged gypsum board is visible through the windows.
   c) Photograph 23, 199, 202, 206 – Roof scupper, photographs.
      i) Photographs 206 and 209 show ponded water not reaching the roof scupper.
      ii) The perimeter of the roof scupper is not sealed to prevent water penetration behind the flashing.
      iii) Water drains off the scupper and cascades down the face of the metal panels below. Dripping and running water will shorten the life of the metal panels and building seals.
      iv) Photographs 203, 210, 211, 212, 213 and 214 show improper construction of the metal parapet to the building connections. There are wide open, unsealed holes into the building. These are most likely causing the water damaged below.
   d) Photographs 24 – 28 – Rear Atrium Glazing. Gaps in aluminum glazing frame.
   e) Photograph 29 – Rear roof band at the second level, buckled rubber flashing. Refer to later photographs for this area.
   f) Photographs 30, 31, 32, 33, 34, 197, 197, 198, 207, 217, 218, 219, 220, 221 & 223. Failed sealant.
   g) Photographs 208 & 222 show gaps in the exterior glazing bead.
   h) Photograph 215 shows exposed plastic shims below the metal panel.
5) Left Side Elevation.
   a) Loading dock photographs 35, 36, 37 & 38.
      i) Gap under swinging door onto loading dock. The threshold is not an exterior weather resistant type of threshold. Wind driven rain can easily blow under the door.
      ii) Light fixture perimeters are not sealed.
   b) Photographs 40,41, 42, & 42 – incomplete construction.
      i) Missing escutcheons around the sprinkler heads. Wall penetrations are not sealed around the sprinkler heads.
      ii) Missing sealant at the doorframe. (42 & 43).
6) Front Elevation. Photograph 47
   a) Left portion, photographs 47 through 61.
   b) Photographs 48, 49, 50, 52, 52, 53 & 61. Unsealed exterior wall penetrations.
   c) Photographs 54, 55, 56 & 59. Failed sealant.
   d) Photograph 54. Missing sealant.
   e) Photographs 57 & 58. rust stain on the concrete appears to be weeping out of the wall. Further review required.
   f) Photograph 60. Unsealed joint, opening into the building.
7) Photographs 62 through 102- from low roof on left side of building showing left elevation of mechanical penthouse and rear elevation.
   a) Photographs 62, 63 & 64 missing sealant in high roof cornice.
   b) Photograph 65 & 66, failed sealant in rear atrium horizontal mullion joint.
   c) Photograph 67 shows water stains on the horizontal steel framing inside the rear atrium.

d) Photograph 68, refer to photographs later in this report.
e) Photographs 69, 70, 71, 72, 73, 74, 75 & 77 show failed seals. The majority of these failed seals are directly above the leaks in the rear atrium.
f) Photographs 76 & 77 shows that the majority of sealed joints in the horizontal mullion has failed and is probably leaking. We did not find any signs of a weeping or drainage system for the horizontal mullion. When the sealant fails the water enters the aluminum framing system and eventually into the building.
g) Photographs 78 & 91 show that the access door onto the low roof was installed without a proper weather resistant 8" high curb. Water easily blows under the threshold and into the building. The threshold has an unsealed gap under it.
h) Photograph 79 – 102 shows the left side elevation of the main entry.
i) Photograph 80 shows that roof patches have started to fail.
j) Photograph 81 shows that metal cap on an unused curb is not sealed, and the vertical legs on the cap are less than 4" high.
k) Photographs 82 & 83 show that there is a significant roof ponding problem in this location. The ponded water is blown by northeast winds towards the door shown in photograph 78 where the water can easily enter the building.
l) Photographs 84, 86- 90, 92, 93, 97 & 99 show failed seals where water can enter the building.
m) Photograph 85 shows a gap in the glazing system.
n) Photographs 94, 95 & 96 show unsealed exterior wall penetrations around pipes, ducts & conduits. These unsealed openings into the building are directly above the leaks in the main entry lobby.
o) The standard 8" high curb that is required to make a weather tight condition under doors onto a roof is missing. See photographs 98, 99 & 100.
p) Photographs 101 & 102 show water damage from the leaks through the gaps listed above.

8) Roof on the right side of the Mechanical Penthouse.
a) Photographs 103 & 140 show the elevator louver vent. Heat was pouring out of the building through this normally open vent. The new energy code allows this vent to be normally closed and controlled by a smoke detector so it opens in the case of a fire.
b) Areas on the low and high roofs requiring repairs. Photographs 104, 105, 106, 107, 123,125, 126, 130, 131, 132, 133, 147, 148, 151, 152 & 153.
c) Mechanical Penthouse Right Side photograph108.
d) Photographs 109, 110 & 111 show areas along the right side of the mechanical penthouse at the rear of the building. The metal siding is only a few inches above the rubber roof membrane. The minimum curb height is usually 8" in order to provide a weather tight roof flashing condition.
e) Photograph 109 & 110 shows concerns with the louver frame. Water stains indicate concentration of water draining from the frame. The drawings do not indicate any flashing around this frame. The foam insulation is oozing out of the joint in the louver. This foam is not to suppose be exposed to sunlight.
i) Photographs 225 through 233 Leaks through the air intake louver. Concerns that the louver maybe installed upside down and backwards. Water is easily entering into the building causing interior water damage to the building and mechanical equipment.
f) Photographs 112, 129 & 234 show a water ponding area on the roof membrane.

g) Photographs 113, 114, 115, 116, 117 & 224 show the door from the mechanical penthouse and the areas immediately surrounding the door.
   i) The sealant around the doorframe is incomplete and there is no sign of flashing.
   ii) Gaps under the door threshold.
   iii) The door curb is only a 2 x on the flat and the rubber flashing is not terminated.
h) Photographs 117, 119, 120, 121, 122, 124, 127, 128 & 146 show sealant failures.
i) Photographs 235, 236 & 237 Parapet wall and building façade intersection with unsealed open holes into the building.
j) Photographs 238 & 239 Sliced rubber base wall flashing.

9) High Roof Photographs 130 through 154.
   a) Photographs 134 & 135 show gaps in the sealant.
   b) Photographs 138, 139, 141, 142, 144 & 145 show unsealed open joints.
   c) Photograph 150 shows unsealed joint between the mechanical curb and the roof curb.
   d) Photograph 154 shows unpainted rusting pipe.
   e) Photographs 130 through 133 show opening into the building directly above several interior leaks in the rear atrium.
   f) Photographs 136 through 145, and 240 and 241 show openings into the building directly above leaks into the front entry, stair and atrium.
10) Interior photographs 155, 157, 158, 170, 175, 176, 181, 182, 183, 184, 187, 191 & 192 showing water stained and/or damaged gypsum board.
11) Interior photographs 156, 159 & 161 show improper sealant on the interior the windows.
12) Photographs 160 & 171 show gaps in the neoprene glazing beads.
13) Photographs 162, 168, 173 show failed insulating glass separators. This is an extensive problem throughout the building.
14) Photographs 163, 164, 165, 166, 167, 169, 172, 174, 178, 179, 185, 189 & 190 shows water stains on the interior of the exterior walls. We could feel cold air blowing in through these unsealed joints.
15) Photographs 117, 180 & 186 show missing interior sealant.
16) Photographs 244 through 263 -Low Roof on Left End of Building.
   a) Photographs 245 & 247- Parapet coping and exterior wall intersection. Unsealed metal-to-metal joints and open holes into the building.
   b) Photograph 247 – Buckled metal fascia, wide open, unsealed joint.
   c) Photographs 248 & 249 Metal panel joint sealant is missing on three side of this panel.
   d) Photographs 250, 251, 252 & 257 – Rubber base wall flashing adhesion failure.
   e) Photographs 255, 256 & 257 – Staples used to attaché felt paper are exposed and stapled into the rubber base wall flashing.
   f) Photograph 258 – Missing metal panel closure trim, a typical condition in most locations on this building.
   g) Photograph 259 Rubber roof base wall flashing patch adhesion failure.
   h) Photographs 260, 261 & 262 Roof mounted exhaust fans are mostly dented. The fasteners are not sealed and the neoprene rubber washers are missing. The metal curb is not sealed water and weather tight to the roof curb.
   i) Photograph 263 Sealant between the metal fascia and metal panels is missing.

Summary of observations:

The architectural drawings do not call for the standard exterior wall penetration flashing in several critical locations. It appears that the Architect was depending on sealant as the main water and weatherproof barrier. Once the sealant fails the building leaks. As can be seen in several photographs, the sealant has failed and the building leaks. The sealant failure is either cohesion or adhesion failure, both of which are usually installation problems. The sealant in some locations is to narrow to work properly, and in other locations it was adhered to a thin edge of metal, which failed.

The back up to the metal panel system is called to be gypsum sheathing with taped joints. The proper weather and water proof installation for gypsum sheathing (or DensGlass) with waterproof joint flashing to prevent water from entering into the building.

It is our opinion that the neither the architectural drawings or the subcontractors shop drawings for the metal panels or the curtain wall, which we received, provided a series of very important flashing and waterproofing details. Several of the areas with holes and opening into the building where not detailed. Joint details and water control and drainage details are missing.

Coordination between the architectural drawings and the mechanical roof equipment drawings is missing, from the drawings. The exterior wall penetrations related to the mechanical equipment are not detailed and not flashed or sealed properly.

As of this date we have not received roof shop drawings or specifications for review. Once we receive these documents we will modify this report accordingly.

As can be seen in the photographic report there are a number of construction defects that have led to the building leaking.

- Failed sealant in several locations.
- Sealant is missing in several locations.
- Sealant is missing on the interior of the aluminum windows and curtain wall frames.
- Unsealed exterior wall penetrations, typical in all locations.
- The rubber roof flashing not extended up under the metal siding far enough.
- The metal siding is less than 8" above the roof.
- The mechanical equipment is not sealed at the curb.
- The mechanical equipment fasteners are missing the neoprene washers.
- The sealant called for between the metal fascia and the metal panels was not installed.
- The aluminum curtain wall system does not appear to have drainage system to handle the water that penetrates through the failed joint seals. This is the case with the horizontal extended mullion, which is called as brake metal on the
- The joint between the roof membrane flashing and the aluminum curtain wall frames has failed.
- The curbs onto the roof from the Mechanical Penthouse are too low (less than 8") and in one case, nonexistent. Water easily blows into the building and damages the gypsum board.

- The exterior door thresholds are missing the weatherproof feature, so water easily blows under the doors.
- The group of conduits and pipes that penetrate the exterior wall are not properly weather and water proofed.
- The mechanical air intake louver allows water to enter the system and has damaged the make up air unit.
- Missing metal closure flashing, Maddison Shop Drawing item #20. This flashing is missing in most locations.
- Water ponding on the roofs. The tapered insulation shown on the architectural roof plan does not appear to have been provided in every location.
- The as-built conditions vary from the architectural and shop drawings.
- Numerous failures of the insulated glass seals and separators

Respectfully submitted for your review and information.

Sincerely,

Stephen J. Wes sling-Architects, Inc.

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